POSEY LAKE

Introduction

Posey Lake is a very small reservoir on the south slopes of the the Aquarius Plateau in south-central Utah. It is nestled in tall spruces, firs and quaking aspen. It is a beautiful little lake abounding with solitude.

The reservoir shoreline is owned and administered by the Dixie National Forest with unrestricted public access. Defined beneficial uses include: water recreation excluding swimming; propagation of cold water species of game fish and aquatic life; and agricultural needs.

Characteristics and Morphometry

Lake elevation (meters / feet)	2,644 / 8,676
Surface area (hectares / acres)	8 / 20
Watershed area (hectares / acres)	111 / 275
Volume (m^3 / acre-feet)	
capacity	123,350 / 100
conservation pool	0
Annual inflow (m^3 / acre-feet)	
Retention time (years)	
Drawdown (m^3 / acre-feet)	
Depth (meters / feet)	
maximum	6 / 19.7
mean	1.5 / 5
Length (meters / feet)	335 / 1,100
Width (meters / feet)	183 / 600
Shoreline (meters / feet)	975 / 3,200

Recreation

Posey Lake is accessible via several different forest service roads from the Escalante, Boulder and Loa areas. The easiest route is probably FS-153 from downtown Escalante. Follow this gravel road northward for 20 miles to FS-154, which passes Posey Lake. Continuing on northward this road will lead you to Loa and other surrounding communities in Wayne county. Other access routes can be determined from a Dixie National Forest map. Fishing is the only recreational activity available at the

Location

County	Garfield
Longitude / Latitude	111 41 43 / 37 56 14
USGS Map	Posey Lake, Utah 1964
Cataloging Unit	Escalante River (14070005)

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reservoir itself, but the surrounding region is replete with hiking areas, including the Phipps-Death Hollow Wilderness. The lake water is too cold for most swimmers and the lake is to small for larger boating. Smaller boats are allowed on the lake and a boatramp is located on the eastern end of the lake. The road is not maintained in the winter. Usage is moderate.

Posy Lake Campground is adjacent to the lake and maintained by the Forest Service. It has 23 campsites, vault toilets and picnic areas. Usage fees are collected.

Limnological Data

Data sampled from STORET site: 595376

Surface Data	1979	1989	1991
Trophic Status	M	M	M
Chlorophyll TSI	-	42.75	45.25
Secchi Depth TSI	36.10	37.40	46.80
Phosphorous TSI	55.40	58.71	45.41
Average TSI	45.75	46.29	45.82
Chlorophyll a (ug/L)	-	3.5	4.5
Transparency (m)	4.5	4.8	2.5
Total Phosphorous (ug/L)	50	44	18
pH	8.5	9.2	8.2
Total Susp. Solids (mg/L)	-	<3	<3
Total Volatile Solids (mg/L)	-	-	5
Total Residual Solids (mg/L)	-	-	<2
Temperature (°C / °f)	19/66	16/60	16/61
Conductivity (umhos.cm)	210	192	219
Water Column Data			
Ammonia (mg/L)	0.13	0.01	0.06
Nitrate/Nitrite (mg/L)	0.27	0.04	0.01
Hardness (mg/L)	110	-	117
Alkalinity (mg/L)	118	-	120
Silica (mg/L)	14	-	18.7
Total Phosphorous (ug/L)	75	48	38
Miscellaneous Data			
Limiting Nutrient	N	N	N
DO (Mg/l) at 75% depth	5.4	5	3.1
Stratification (m)	NO	NO	NO
Depth at Deepest Site (m)	6	5.6	4.7

Watershed Description

Posy Lake is on a long, forested slope that begins at at the crest of the Aquarius Plateau. From the plateau top at 3,200 meters, the land drops off down to the Escalante River at 1,800 meters. Posy Lake is near the top of the slope, and requires a substantial climb on primitive roads through the forest. The inflow is the drainage from Tule Lakes, which are 0.5 miles upstream, and the outflow is Hungary Creek.

The watershed high point is 2,865 m (9,400 ft) above sea level, thereby developing a complex slope of 8% to the lake. The average stream gradient above the reservoir is 6.6% (349 feet per mile).

The soil is of volcanic origin. For a complete listing of soil type composition refer to Appendix III.

The vegetation communities are comprised of pine, aspen, spruce-fir and oak. The watershed receives 51 cm (20 inches) of precipitation annually with a frost-free season of 60 - 100 days at the reservoir.

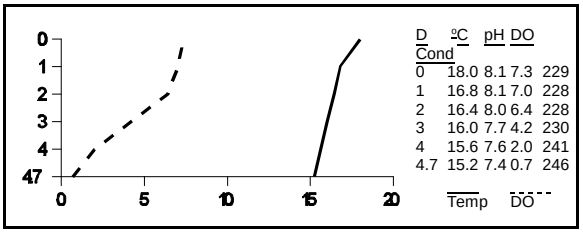
Land use is multiple use and recreation. Dixie National Forest encompasses the entire drainage area.

Limnological Assessment

The water quality of Posey Lake is considered good. It is considered to be moderately hard with a hardness concentration value of approximately 119 mg/L (CaCO3). Those parameters that have exceeded state water quality standards include phosphorus, dissolved oxygen and pH. Annual phosphorus values continually exceed the pollution indicator value of 25 ug/L. Averages for the three study periods are 75, 48 and 38 ug/L. These elevated nutrient levels induce algal blooms and coupled with the extensive growth of macrophytes (large leaf varieties and *Potamogeton*) in the lake are responsible for the exceedences related to dissolved oxygen and pH. Ph values are elevated naturally due to photosynthetic activity during the day and depletion of dissolved oxygen occurs during the night as plants shift to respiration processes to obtain energy requirements. In addition anoxic conditions may become more critical during the winter due to the decomposition of all the plant material produced during the summer productivity period. This indicates that some winter monitoring should be conducted to determine if impairments are present during extended ice coverage conditions during the winter.

Current data suggest that the reservoir is currently a nitrogen limited system. TSI values indicate the reservoir is mesotrophic in a state of moderately high productivity.

One of the major problems is the excessive amount of macrophytes produced which physically restrict movement on or in the reservoir and contribute to loss of oxygen when they decompose. There is no real potential for stratification in the lake due to insufficient depth in the lake. The profile on August 8, 1990 is evident of the shallow nature of the lake and the decline of dissolved oxygen in the water as previously described.



According to DWR it is not uncommon to have at least a partial fishkill due to loss of oxygen during the winter period. Due to the problem in maintaining a fishery, the U.S. Forest Service is presently studying ways of increasing the lakes water volume. Rainbow (*Oncorhynchus mykiss*) and brook (*Salvelinus fontinalis*) trout are stocked annually by DWR. The lake has not been treated for rough fish competition, so populations of native fishes may still be present in the lake.

The DWR stocked Posy Lake with 4,500 catchable rainbow trout and 2,500 fingerling brook trout in 1991.

Phytoplankton in the euphotic zone include the following taxa (in order of dominance)

Species	Cell Volume (mm^3/liter)	% Density By Volume
Sphaerocystis schroeteri	301.074	92.54
Anabaena spiroides v. crassa	23.129	7.11
Quadrigula lacustris	1.112	0.34
Staurastrum gracile	0.017	0.01
Ankistrodesmus falcatus	0.013	0.00
Pennate diatoms	0.006	0.00
Oscillatoria sp.	0.006	0.00
Total	325.357	
Shannon-Weaver [H']	0.28	
Species Evenness	0.14	
Species Richness	0.23	

The phytoplankton community is dominated by the presence of green algae with a significant quantify of blue-green algae. This is indicative of fairly good water quality and moderate eutrophic conditions.

Pollution Assessment

Nonpoint pollution sources include: sedimentation and nutrient loading from grazing, and human wastes and litter from recreation. Cattle graze in the watershed and around the reservoir.

There are no point pollution sources in the watershed.

Beneficial Use Classification

The state beneficial use classifications include: boating and similar recreation (excluding swimming) (2B), cold water game fish and organisms in their food chain (3A) and agricultural uses (4).

Information

Dixie National Forest	586-2421
Escalante Ranger District	826-4221
Five County Association of Governments	
Division of Wildlife Resources	538-4700
Division of Water Quality	538-6146

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